Public Health Identification & Interventions for At-Risk Populations from Fish Contamination in NJ and NY

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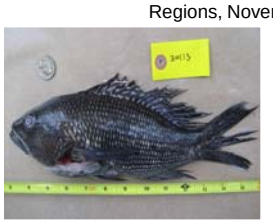


Genesis of the issue

NYCDOHMH conducted the first local health and nutrition examination survey (NYC HANES)

- Multiple biomarkers including BHg
- New Yorkers have over 3 times the national average of blood mercury concentrations.[6]
- 25% of the those tested had blood mercury conc. ≥ 5µ/L (the NY State reportable level)[6]
- Foreign born Chinese had blood mercury concentrations > 8 times general population[6]

[1]McKelvey W, Gwynn RC, Jeffery N, Kass D, Thorpe LE, Garg RK, et al. 2007. A biomonitoring study of lead, cadmium, and mercury in the blood of New York city adults. Environ Health Perspect 115:1435-1441.

Populations of Interest Profiled in Other Studies

- NE >19% of ♀Blood Mercury (BHg) over 3.5mg/L[2]
- 16.4% of US females aged15-45 years eat fish at least once a day[6]
- Higher income, college-educated ♀ living in NE at highest risk[5]
- ♀ in and near coastal areas 3 to 4 times ↑risk[2]
- Asian diet - eat fish more frequently, in greater variety and quantity than non-Asians[3]
    - NY 10.4% population are Asians
    - NJ 8.4%[4]

Follow Up

1. Fish Market Testing
    - EPA R2 (wholesale market)
    - NYC DoHMH (Asian retail stores)
2. GIS Targeting Tool
3. Health Care Provider Curriculum

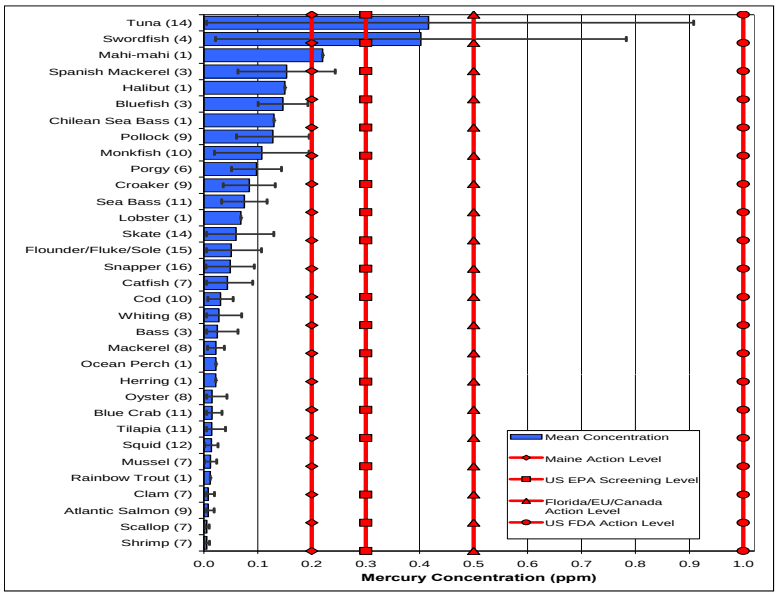
Fish Market Testing

EPA Hg Fish Tissue Study (Sampling)

- Fulton Fish Market (NYC)
  - Largest wholesale market in the US
  - 22* most commonly consumed species of fin and shell fish
  - Composite of 3 specimens per sample for most species
  - Target sample size (N = 10 - 15)
  - Super samples for small species (e.g., shrimp, clams, crabs)
  - DNA sequencing

* Additional species collected but constrained by small (<4) sample size

Results



EPA Fish Selection Process

- Regional and national commercial seafood landings (NMFS)
- Net local/national imports/exports (US Census, NMFS)
- Domestic aquaculture production (USDA)
- Surveys of fish species sold in stores (Burger studies)
- Listing of seafood products sold by FFM wholesalers
- List modified by observations and discussions in FFM

NYCDOHMH Study Design & Protocol

- 20 fish species popular among the Chinese
  - Hg
  - PCBs
  - DNA sequencing
- NYC fish markets located in top 10% Chinese populated census tracts
- 15 of each target fish species: 4, 5 and 6 specimens from stores in Manhattan, Brooklyn and Queens, respectively.

Source: NYCDOHMH, Wendy McKelvey

NYC Criteria for Selecting Target Species*

- **Availability (based on volume) in stores in the three target neighborhoods.**
- **Inadequate data on mercury content.**
- **Fish is on NYC "recommended" list, but with potential for PCB contamination.**
- **Change in import patterns.**

*Source: NYCDOHMH, Wendy McKelvey

NYC Conclusions*

- Higher Hg levels in Chinese New Yorkers probably due to eating more (lower Hg) fish and lower bodyweight.
- No evidence that specimens from Chinese markets are higher in Hg.
- High within-species variability in PCB levels.
- OC pesticide levels were low.
- Hg and PCB levels not strongly correlated, which complicates combining the data in risk messages.
- Communicating meal allowances for combinations of species is a challenge.

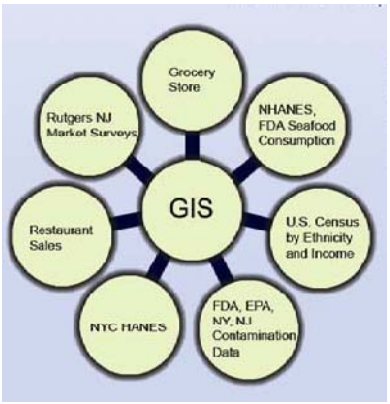
*Source: NYCDOHMH, Wendy McKelvey

2. GIS Targeting Tool

- Identify areas where women of child bearing years and young children in NJ and NY are at highest risk for consumption of contaminated fish and seafood.
- Integrate lowest geospatial parameters to examine consumption patterns and contaminant exposure
  - Census tract level
  - Need to model data… thus there are numerous assumptions
- First attempt to develop a tool to pinpoint areas of highest risk

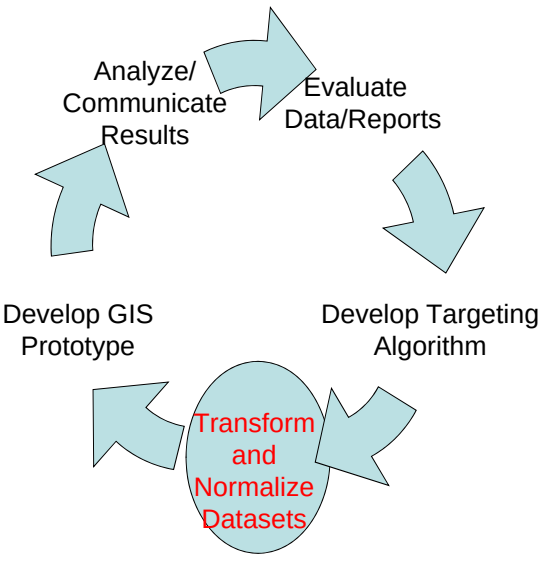
Data Sources Utilized

- Using multiple existing data sources
  - SES
    - Census SF1 & SF4 files for socio-demographic break downs (age, ethnicity, gender, earnings)
    - Rural-Urban Commuting Area Codes (developed by USDA & Rural Health Research Center)
  - **Consumption**
    - Grocery store fresh fish sales through scanner data
    - NOAA Per Capita Consumption
  - **Contamination**
    - EPA Fulton Fish Market Analysis, NYC DoHMH, Burger NJ studies, NOAA and FDA



Different data explored

Process of GIS Tool



Data Used to Identify Audiences for Outreach

- Physicians (Ob/Gyns and Pediatricians)
  - Contact information and Language Spoken
    - NYS Physician Profile
    - NJ Division of Consumer Affairs NJ Health Care Profile
- Hospitals
- WIC Clinics
- State and Local Health Departments

Developing Health Care Provider Curriculum - CME's and CE's

- Developing educational modules on fish consumption – under development by Wisconsin Department of Health – estimated completion date by end of year
- Video and workbook format covering
  - **Toxicology and epidemiology**
  - **Hazard identification and exposure assessment**
  - **Clinical perspectives**
  - **Risk Communication & Fish Advisories**

Targeted Outreach

- Physicians and nurses in areas of high consumption of contaminated fish
  - Educational modules
  - Current advisories brochures
  - Increase knowledge of healthy seafood choices
  - Share info on best low-contaminant sources omega-3 fatty acids
  - Ask health care providers to screen and provide education to high risk patients
- Future applications:
  - Hope to provide health care providers, state and local health departments, and policy analysts an effective method for targeting vulnerable populations

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- 2 Mahaffey,KR, Clickner RP, Jeffries, RA. 2008. Adult Women's Blood Mercury Concentrations Vary Regionally in USA (NHANES 1999-2004). Environ Health Perspectives. doi: 10.1289/ehp.11674 (available at http://dx.doi.org/), August, 2008.
- 3 Kudo et al 2000 Eur J Clin Nutr54:665-670; Sechena, R et al 2003. Asian-American and Pacific Islander seafood consumption-a community based study in King Co, WA. J Expo Anal Environ Epidemiol 13:256-266.
- 4 The Asian Population: 2000. *Census 2000 Brief*
- 5 Knoebloch, L. et al (2005) Fish Consumption, advisory awareness & hair mercury levels among women of childbearing age, Env Research, 97, p220.
- 6 McKelvey W, Gwynn RC, Jeffery N, Kass D, Thorpe LE, Garg RK, et al. 2007. A biomonitoring study of lead, cadmium, and mercury in the blood of New York city adults. Environ Health Perspect 115:1435-1441.

Questions??